## PATENT COOPERATION TREATY

## PCT

I UEC.D	1 /	MA	AK Z	2005	
WIRO					

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

03 JUN 2005

Applicant	e or an	ente file reference				
Applicant's or agent's file reference CH920030007 International application No. PCT/IB 03/05128		FOR FURTHER A	CTION	See Notification Preliminary Exa	of Transmittal of International mination Report (Form PCT/IPEA/416)	
					Priority date (day/month/year) 05.12.2002	
Internation B01L3/0	nal Pate 00	ent Classification (IPC) or b	oth national classification	and IPC		·
Applicant				··· <u>··</u> ·		
		NAL BUSINESS MAC	HINES CORPORAT	ION		•
1. This Aut	s interr thority a	national preliminary exar and is transmitted to the	nination report has bee applicant according to	en prepare Article 36	ed by this Interi	national Preliminary Examining
2. This	s REP(	ORT consists of a total of	f 4 sheets, including t	nls cover	sheet.	
Ø	This beer (see	report is also accompar amended and are the b Rule 70.16 and Section	iled by ANNEXES, i.e. asis for this report and	sheets of	the descriptions containing rec	n, claims and/or drawings which have ctifications made before this Authority
The	•	nexes consist of a total o	in o , tarriin ilotrat	ive instru	cuons under th	e PCT).
				· · · · · · · · · · · · · · · · · · ·		
This	s report	t contains indications rel	ating to the following ite	ems:		•
ı	$\boxtimes$	Basis of the opinion	•			
H		Priority				
111		Non-establishment of o	oinion with regard to no	aveity in	ontivo oton en	al franchiscadad - 12 a suc
IV		Lack of unity of invention	n	overty, miv	entive step and	a industrial applicability
٧	×	·	ider Bule 66 2/a\/ii\ wii	th regard	to novelty, inve	entive step or industrial applicability;
VI		Certain documents cite				
VII		Certain defects in the in	ternational application			
VIII		Certain observations or	the international appli	cation		
ate of sub	mission	of the demand		Date of co	empletion of this	report
4.06.200	04			18.03.20	005	
ime and reliminary	examin	address of the international		Authorized	Officer	netika Prizeza.
European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016				Tiods -	•	in the same of the
			51 epo ni	Tiede, F		<b>( ((0)</b>
	. u.	.0170070-0010		Telephone	No. +31 70 340	1000

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/IB 03/05128

i.	<b>Basis</b>	of	the	re	port
----	--------------	----	-----	----	------

1. With regard to the **elements** of the international application (Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)):

	Des	scription, Pages				
	1-2	7	as origi	inally filed		
	Cla	ims, Numbers		•		
	28-	43	as origi	inally filed		
	1-2	7	receive	ed on 24.06.2004 with letter of 21.06.2004		
	Dra	wings, Sheets			·	
	1/4-	4/4	as origi	inally filed		
2.	. With regard to the <b>language</b> , all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.					
These elements were available or furnished to this Authority in the following language: , which is:						
		the language of a tra	nslation furnish	ed for the purposes of the international search (un	der Rule 23.1(b)).	
		the language of publ	ication of the int	ternational application (under Rule 48.3(b)).		
		the language of a tra Rule 55.2 and/or 55.	nslation furnish 3).	ed for the purposes of international preliminary ex	amination (under	
3.	With inte	n regard to any <b>nucle</b> mational preliminary	otide and/or an examination was	nino acid sequence disclosed in the international s carried out on the basis of the sequence listing:	application, the	
		contained in the inte	rnational applica	ation in written form.		
		filed together with th	e international a	application in computer readable form.		
	☐ furnished subsequently to this Authority in written form.					
		furnished subsequer	ntly to this Autho	ority in computer readable form.		
		The statement that the international a	he subsequently pplication as file	y furnished written sequence listing does not go be	yond the disclosure	
		The statement that the listing has been furnit	ne information reshed.	ecorded in computer readable form is identical to t	he written sequence	
4.	The	amendments have re	esulted in the ca	ancellation of:		
		the description,	pages:			
	$\boxtimes$	the claims,	Nos.:	28-43		
		the drawings,	sheets:			



International application No.

PCT/IB 03/05128

5. 🛘	This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).
	(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

- 6. Additional observations, if necessary:
- V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- 1. Statement

Novelty (N)
Yes: Claims
No: Claims
Inventive step (IS)
Yes: Claims
1-27
No: Claims
Industrial applicability (IA)
Yes: Claims
1-27

No:

Claims

2. Citations and explanations

see separate sheet

### Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following documents:

D1: WO 99/56878 A (VETTER DIRK ;GRAFFINITY PHARMACEUTICAL DESI (DE); SCHMIDT KRISTINA) 11 November 1999 (1999-11-11)

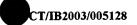
The document D1 is regarded as being the closest prior art to the subject-matter of claim 1, and shows (the references in parentheses applying to this document):

A device comprising for bringing a liquid to said substrate (page 4 and 5, fig. 1).

The subject-matter of claim 1 differs from this known device in that the outer sides of the conduits, which limit the end surface of the protrusion are of limited wettability while the end surface itself is wettable by said liquid.

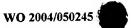
This makes smaller recesses possible and thus improves such devices. No incentive could be found in D1 to limit the liquid by a superposing geometrical and wettability patterns. Subject-matter of claim 1 is therefore novel and inventive (Article 33 PCT).

Claims 2-27 comprise all technical features of claim 1. They are therefore equally novel and inventive (Article 33 PCT).



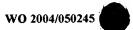
#### **CLAIMS**

- 1. A device for applying a liquid to a substrate surface, the device comprising a chamber for carrying the liquid, an aperture in the chamber for communicating liquid from the chamber to the substrate surface via a conduit having outer sides of limited wettability to the liquid.
- 2. A device as claimed in claim 1, having a body including a protrusion defined by the outer sides of the conduit.
- 3. A device as claimed in claim 1, wherein the conduit 10 comprises inner sides wettable by the liquid.
  - 4. A device as claimed in any preceding claim, wherein the body comprises a plane inner surface surrounding the protrusion and a plane outer surface parallel to, offset from, and surrounding the inner surface, the protrusion extending from the inner surface and having an end coplanar with outer surface.
  - 5. A device as claimed in claim 4, wherein the inner surface forms a peripheral recess surrounding the protrusion.
- 6. A device as claimed in claim 4, wherein the outer surface 20 is of limited wettability to the liquid.
  - 7. A device as claimed in claim 4, wherein the end of the protrusion is wettable by the liquid.
- 8. A device as claimed in claim 1, comprising: a first chamber for carrying the liquid; a second chamber for carrying the liquid; a first aperture in the first chamber for communicating liquid from the first chamber to the substrate surface via a first conduit having outer sides of limited wettability to the liquid; and, a second aperture in the second chamber for communicating liquid from the second



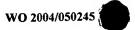
chamber to the substrate surface via a second conduit having outer sides of limited wettability to the liquid.

- 9. A device as claimed in claimed in claim 8, having a body including a protrusion defined by the outer sides of the first and second conduits.
  - 10. A device as claimed in claim 8 or claim 9, wherein the first and second conduits comprise inner sides wettable by the liquid.
- 11. A device as claimed in any of claims 8 to 10, wherein the body comprises a plane inner surface surrounding the protrusion and a plane outer surface parallel to, offset from, and surrounding the inner surface, the protrusion extending from the inner surface and having an end coplanar with outer surface.
- 15 12. A device as claimed in claim 11, wherein the inner surface forms a peripheral recess surrounding the protrusion.
  - 13. A device as claimed in claim 11, wherein the outer surface is of limited wettability to the liquid.
- 14. A device as claimed in claim 11, wherein the end of the 20 protrusion is wettable by the liquid.
  - 15. A device as claimed in claim 14, wherein the end of the protrusion comprises a flow path extending from the first aperture to the second aperture.
- 16. A device as claimed in claim 15, wherein: the first
  25 chamber has a first pressure for retaining the liquid when the
  flow path is remote from the substrate surface; the second
  chamber has a second pressure such that the difference between
  the first and second pressures is oriented to promote flow of
  the liquid from the first chamber to the second chamber via
  30 the flow path in response to the flow path being located

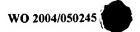


proximal to the substrate surface and the liquid in the device contacting the substrate surface; and, the first and second pressures are such that the liquid is drawn towards at least the second chamber in response to withdrawal of the flow path from the substrate surface.

- 17. A device as claimed in claim 16, wherein at least one of the first chamber and the second chamber comprises a capillary network for applying pressure to the liquid.
- 18. A device as claimed in claim 17, wherein the or each capillary network comprises at least one of a plurality of parallel capillary members, a mesh, a porous material, and a fibrous material.
  - 19. A device as claimed in any of claims 15 to 18, comprising a plurality of first chambers each coupled to the flow path.
- 15 20. A device as claimed in any of claims 15 to 19, comprising a plurality of second chambers each coupled to the flow path.
  - 21. A device as claimed in any of claims 15 to 20 wherein the flow path has one of a curved cross section and a rectangular cross section.
- 20 22. A device as claimed in any of claims 15 to 21, wherein the first and second pressures are such that the liquid is drawn towards the first chamber and the second chamber in response to withdrawal of the flow path from the substrate surface.
- 25 23. A device as claimed in any of claims 15 to 22, wherein the second aperture surrounds the first aperture.
  - 24. A device as claimed in any preceding claim of unitary construction.



- 25. A device as claimed in claim 24, formed from any one of polymer, glass, silicon, SU-8, photoresist, thermoplastic, ceramic, and metal.
- 26. A device as claimed in any claim preceding claim 24 of layered construction.
  - 27. A device as claimed in claim 26, wherein each layer is formed from one of polymer, glass, silicon, SU-8, photoresist, thermoplastic, metal, and ceramics.
- 28. An array of devices each as claimed in any preceding 10 claim.
  - 29. A method for applying a liquid to a substrate surface, the method comprising: locating a device as claimed in any of claims 1 to 14 proximal to the substrate surface; supplying the liquid to the substrate surface via the device; and, retracting the device from the substrate surface.
  - 30. A method for applying a liquid to a substrate surface, the method comprising: locating a device as claimed in any of claims 15 to 23 proximal to the substrate surface; supplying the liquid to the substrate surface via the device; flowing the liquid from the first chamber to the second chamber via the flow path; and, retracting the device from the substrate surface.
- 31. A method as claimed in claim 30, further comprising varying the flow of the liquid from the first chamber to the second chamber during the supply of the liquid to the surface.
- 32. A method as claimed in claim 29 to 31, further comprising: prior to the retracting, moving the device relative to the substrate surface with the liquid in the or each aperture contacting with the substrate surface.



- 33. A method for applying a liquid to a substrate surface, the method comprising: locating a device as claimed in any of claims 8 to 14 proximal to the substrate surface; supplying the liquid to the substrate surface via the device; moving the device relative to the substrate surface with the liquid in the apertures contacting with the substrate surface; and, retracting the device from the substrate surface.
- 34. A method as claimed in claim 33, comprising orienting the device relative to the substrate surface such that traces of the liquid produced as the device is moved relative to the substrate surface remain separate.
  - 35. A method as claimed in claim 33, comprising orienting the device relative to the substrate surface such that traces of the liquid produced as the device is moved relative to the substrate surface overlap.
  - 36. A method as claimed in any of claims 33 to 35, further comprising, prior to locating, loading a similar liquid into the first and second chambers.
- 37. A method as claimed in any of claims 33 to 35, further comprising, prior to locating, loading different liquids into the first and second chambers.
- 38. A method for applying a liquid to a substrate surface, the method comprising: locating an array of devices as claimed in any of claims 15 to 22 proximal to the substrate surface;

  25 supplying the liquid to the substrate surface via the array; in each device of the array, flowing the liquid from the first chamber to the second chamber via the flow path; moving the array relative to the substrate surface with the liquid in each aperture contacting with the substrate surface; and, retracting the array from the substrate surface.
  - 39. A method as claimed in claim 38, further comprising, in at least one device of the array, varying the flow of the



liquid from the first chamber to the second chamber during the supply of the liquid to the surface.

- 40. A method as claimed in claim 38 or claim 39, comprising orienting the array relative to the substrate surface such that traces of the flows of liquid produced as the array is moved relative to the substrate surface remain separate.
  - 41. A method as claimed in claim 38 or claim 39, comprising orienting the array relative to the substrate surface such that traces of the flows of liquid produced as the array is moved relative to the substrate surface overlap.
  - 42. A method as claimed in any of claims 38 to 41, further comprising, prior to locating, loading a similar liquid into each device of the array.
- 43. A method as claimed in any of claims 38 to 41, further comprising, prior to locating, loading different liquids into each device of the array.